DEVELOP EARTHQUAKE SYSTEM FOR SAFETY BY USING WIRELESS SENSOR NETWORK (WSN)

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I/We* hereby declare that I/We* have checked this thesis/project* and in my/our* opinion, this thesis/project* is adequate in terms of scope and quality for the award of the degree of *Doctor of Philosophy/ Master of Engineering/ Master of Science in ……..

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I hereby declare that the work in this thesis is based on my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree at Universiti Malaysia Pahang or any other institutions.

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ABSTRAK

Bagi menggantikan rangkaian berasaskan kabel yang sedia ada, rangkaian sensor tanpa wayar bertukar menjadi mekanisme untuk pemantauan kesihatan struktur kejuruteraan kerana ianya mudah untuk dipasang dan dikendalikan secara amnya. Walaubagaimanapun, masih terdapat ujian yang tidak disesuaikan yang merupakan kepercayaan khusus aplikasi berkenaan pengenalan kesalahan sensor dan toleransi. Kebolehpercayaan juga dipengaruhi oleh pengurangan sifat semakan semasa melegakan kewajiban WSN. Ini boleh dicipta oleh kekurangan dalam memegang sensor, rasuah ketepatan, peningkatan intensifikasi, kecenderungan, terapung, kekecohan, dan sebagainya. Usaha ini menumpukan pada memerhati penghantaran maklumat dalam sistem sensor tanpa wayar untuk menjamin kualiti pemeriksaan kesihatan struktur yang teguh dengan mencadangkan strategi lain untuk system.

ABSTRACT

As a contrasting option to current wired-based networks, wireless sensor networks (WSNs) are turning into an inexorably convincing stage for monitoring building structure because of generally minimal effort, simple establishment, thus forth. However, there is as yet an unaddressed test which is the application-particular trustworthiness regarding sensor fault identification and tolerance. The reliability is additionally influenced by a lessening on the nature of checking while relieving WSN obliges. This can be created by deficiencies in sensor holding, accuracy corruption, intensification increase, inclination, float, commotion, et cetera. This venture is concentrating on observing information transmission in wireless sensor system to guarantee the unwavering quality of structural health checking by proposing another strategy for system.

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LIST OF ABBREVIATIONS

RAD	Rapid Application Development
SDLC	Software Development Life Cycle
WSN	Wireless Sensor Network

CHAPTER 1

INTRODUCTION

1.1 Background of Study

Nowadays, there are many skyscrapers in the world, and most of the building have earthquake detector and some do not have. Based on the articles on April 22, Harian Metro, Manila, Philippines an earthquake measuring 6.3 magnitude shakes the middle of the Philippines, US Geological Survey Center (USGC). The quake was recorded 60 miles northwest of Manila at a depth of 40 kilometers. This natural disaster can be worst if there is no earthquake system in the building. By using technology this natural disaster can save more lives. In this technology, earthquake system is the mature way to save thousand lives.

Earthquake system are actualized for structures, for example, spans. Structures to screen their operations and wellbeing status. The destinations of this system are to decide health status like the damage, which is a striking change around a sensor area of a structure, and gives both long haul observing and fast investigation in light of strange incident. In this case, this system only requires one sensor located at the skyscraper section to detect the tremors from the ground. Hence, the surrounding buildings require only one alarm device installed at each building near the sensor.

1.2 Problem Statement

Problem statement in this project is about a natural disaster that is often unexpected and also to ensure that every building in the world has a system of earthquakes. So, this project being able to help reduce the rate of natural disasters that often occur in this world.

In converging area, sending the information in quickest way is one of the way to improve safety in their life. Hence, this project will help people who live or work inside the building get an information about the earthquake in fastest way.

1.3 Objective

The main objective of this project:

i. To study about current system of earthquake detector.
ii. To propose an earthquake system for safety using wireless sensor network.
iii. To test the data transferred wirelessly.

1.4 Scope

The scope of this project is focusing on some point that stated below:

i. To study focus on the advantages using wireless architecture rather then wired architecture.
ii. The sensors in Module A will detect the vibration and alert the people who live inside the building with buzzer and send the signal to the Module B and also alert the people with buzzer.
iii. This prototype consist of Arduino NANO controller, Vibration Sensor Module, Buzzer and RF Module transceiver.

1.5 Thesis Organization

This thesis consists of five chapters of major division.

In Chapter 1, we will discuss about an introduction to the research. It describes about the project and its related issues. It also cover problem statement, objective and scope of the project

In Chapter 2, it shall discuss the literature review of the project contains the information about the project in general. It describe existing framework about the other parties. It also contain the solution of the problem related to the project.

In Chapter 3, it discusses about the overall approaches and the framework regarding the project. It include the introduction,

In Chapter 4, the implementation of the simulation WSN is discussed and it will tell about the result of the simulation.

Lastly, in Chapter 5, it explain the conclusion of the project. It covers research constraints and future work.

Last but not least, in terms of time management, it is hard to finish this project on time due to time limitation. As a student, there are many classes have to attend and assignments need to be done on time. So this project is finished with struggling on time management itself.

5.3 Research Constraint

In this future, we expect to extend this system to detect and describe other types of unexpected events, such as natural disasters. By implementing this system in various type of building, it could save a lot of people lives. In other words, I hope that this system will implement the other sensor that related to earthquake system as it is not used in this project in order to make it more reliable and stable.

REFERENCE

(n.d.). Retrieved from Guru99What is BLACK Box Testing? Techniques, Example & Types: https://www.guru99.com/black-box-testing.html

Allan, J. (17 April, 2017). *Firebase Realtime Database*. Retrieved from THE CODE NINJA: https://androidstudy.com/2017/04/17/firebase-realtime-database/

altexsoft. (19 February, 2018). *Xamarin vs React Native vs Ionic: Cross-platform Mobile Frameworks Comparison*. Retrieved from altexsoft: https://www.altexsoft.com/blog/engineering/xamarin-vs-react-native-vs-ionic-cross-platform-mobile-frameworks-comparison/

Beal, V. (2013). *Agile software development*. Retrieved from webopedia: https://www.webopedia.com/TERM/A/agile_software_development.html

cmarix. (29 August, 2016). *14 Benefits of using FIrebase*. Retrieved from cmarix: http://www.cmarix.com/14-benefits-of-using-firebase/

Cruxlab, I. (21 September, 2017). *Xamarin vs Ionic vs React Native: differences under the hood*. Retrieved from TheStartup: https://medium.com/swlh/xamarin-vs-ionic-vs-react-native-differences-under-the-hood-6b9cc3d2c826

Esplin, C. (24 October, 2016). *What is Firebase*. Retrieved from HowtoFIrebase: https://howtofirebase.com/what-is-firebase-fcb8614ba442

FingerTec. (2016 September, 2016). *5 Common Attendance Cheats You Might Overlook*. Retrieved from FingerTec Beyond Biometric: http://www.fingertecblog.com/2016/09/5-common-attendance-cheats-you-might.html

Firebase. (21 March , 2018). *Firebase Realtime Database*. Retrieved from Firebase: https://firebase.google.com/docs/database/

https://circuitdigest.com/microcontroller-projects/arduino-earthquake-detector-alarm-circuit

https://www.instructables.com/id/Earthquake-Detector-1/

https://howtomechatronics.com/tutorials/arduino/arduino-wireless-communication-nrf24l01-tutorial/

https://howtomechatronics.com/tutorials/arduino/arduino-wireless-communication-nrf24l01-tutorial/